

PUBLIC HEALTH GIS NEWS AND INFORMATION

December 1996 (No. 13)

Dedicated to CDC/ATSDR scientific excellence and advancement in disease control and prevention using GIS

Selected Contents: Meetings and conferences (p.1); News from GIS Users (pp.1-5); GIS outreach (p.5); Special reports (pp.5-8); Public health GIS literature (pp.8-11); Cancer registries (pp.17-19); Attachment- list of geoscience journals (pp.21-25).

I. Public Health GIS (and related) Events

☛ Conference on GIS and Applications of Remote Sensing to Disaster Management, University of Maryland, Inn and Conference Center, College Park, Maryland, January 16-18, 1997. Sponsored by NASA (National Aeronautics and Space Administration) and FEMA (Federal Emergency Management Association). Contact: Sandie Jones, (301) 220-1701, email: sjones@pop200.gsfc.nasa.gov, or you may wish to visit http://ltpwww.gsfc.nasa.gov/ndrd/GIS_conference.html.

☛ CDC and ATSDR Symposium on Statistical Methods- Statistical Bases for Public Health Decision Making: From Exploration to Modeling, Atlanta, January 28-30, 1997. Contact: Barbara McDonnell, Ph: (404) 639-3806 or email bgm4@epo.em.cdc.gov.

☛ Annual meeting (93rd) of the Association of American Geographers, Ft. Worth, TX, April 1-5, 1997. Please contact: AAG, 1710 16th Street, NW, Washington, DC 20009-3198 or visit gaia@aag.org.

☛ Thirteenth International Symposium planned on Computer-Assisted Cartography, AUTO-CARTO 13, Washington State Convention Center, Seattle, 9-10 April 1997; Contact: Nicholas Chrisman, Director (chrisman@u.washington.edu), Postal mailing address: Geography, Box 353550, University of Washington, Seattle, WA 98195-3550, or please visit weber.u.washington.edu/~autoc13/.

☛ Fifth annual GIS Research Conference, University of Leeds, UK, 9-11 April 1997; Further information may be found on the GISRU97 web page: <http://www.geog.leeds.ac.uk/gisruk97.html>.

☛ Planned Joint European Conference on Geographical Information, Vienna, Austria, April 16-18, 1997. For more information, see www.frw.ruu.nl/jecc/.

☛ Advance notice of the 1997 Public Health Conference on Records and Statistics, Washington, D.C., July 28-31; The Announcement and Call for Papers was mailed on November 15, 1996. A session entitled "Geographic Information Systems: An Exploratory Tool for Disease Surveillance and Analysis" is open to submission (closes Feb. 3, 1997); contact: Barbara Hetzler, NCHS, (301) 436-7122, ext.148.

II. News from GIS USERS

(Please communicate directly with colleagues on any issues)

A. General News

1. From **Katherine Heck**, NCHS (her response follows to the Editor's request for information concerning the recent CDC program entitled "Geo-psychographic data presentation"): Vicki Freimuth, OD (CDC), introduced the program. Geo-psychographic data are lifestyle, beliefs, values, media habits, personality trait variables for population subgroups within defined geographic locations. Fred Freidinger, Nutrition and Physical Activity Program (NUPAC) in the Chronic Disease Center, presented information on how his branch is using these types of data. They're trying to promote healthy eating and physical activity. They used the data to develop a comprehensive profile of their target audience, and

used the stages of change model to target the contemplators and preparers. Melissa Taylor, NCI,

coordinates the cancer information service for 19 U.S. sites. She used the Claritas data from Inforum to target areas with low mammography and Pap rates - she created demographic profiles and looked at the media habits of non-users of cancer screening to see where to target messages (e.g., if non-users shop at Wal-Mart we could put a poster there, or they watch this channel so we could put a public service announcement or PSA there, etc.). She also used the data to find out where are high concentrations of 55-74 year olds and Hispanics. Ed Maybach, Porter / Novelli, helps to create Health Styles data. HealthStyles is a behavioral psychographic database, not geographic. It's designed specifically for program planning. The way to use it is: 1) profile or identify a target audience; 2) identify effective behavior change strategies; 3) suggest effective messages; 4) identify the best media strategies; 5) identify "life path points" e.g. TV, radio, Target, etc. where people spend their time; and 6) identify cross-promotion opportunities. Health Styles will provide an index like an SMR of your target audience regarding where you might reach them; e.g. they might have a 124 for adult contemporary radio: i.e. they are 24% more likely than average to listen to adult contemporary, so that's a good place to put a PSA. HealthStyles has info on smoking, alcohol use, physical activity, nutrition, health care utilization, lifestyle info, shopping patterns, media use, attitudes, etc. and many others for different demographic groups.

Fred Navarro and Mickey Small, Sachs Group/PATH Institute (PATH is Profiles of Attitudes Toward Health care), segments people into "types" regarding their use of health care-- ready user, avoider, naturalist, etc. Health Plus provides local market level data allowing for media planning. Michael Madigan and David Miller, Claritas (a demographic data provider and 4th largest market research organization in the U.S.) discussed their demographics system called PRIZM which uses data from >1600 state, local, and federal data sources. It provides neighborhood level demographics and is a good predictor of consumer behavior. It was created to help consumer marketing of products at the zip+4 or block group level. Using factor analysis, they came up with 62

unique cluster assignments identifying types of areas and gave them cute names (e.g. Blue Blood Estates, Shotguns & Pickups, etc.) so you can target messages to the types of people in which you have an interest. Bill Patterson, Inforum/MedStat group, said they provide data to acute care facilities and hospitals. They do a survey called Pulse - a phone survey of 100,000 completed households per year - and then geocode the address and assign a PRIZM cluster to the response. They ask about 56-60 topics such as doctor services, ambulatory surgery, high blood pressure, birth, mammography, use of urgent care centers, etc. There's also a health status component such as health behaviors, chronic disease, general health status, etc.

2. GIS Users often inquire about which GIS desktop software is recommended above others. There are a variety of choices which individuals need to explore for his or her own project needs. A recent news release from one contracting company may be of interest: Cambridge, Mass. (August 7, 1996)... MapInfo Corporation (Troy, NY), in conjunction with Harvard Design and Mapping Company, Inc., has been selected by the Federal Emergency Management Agency (FEMA), Washington, DC as its new standard desktop mapping platform, and to provide geographic information system (GIS) software to FEMA headquarters and regional offices. FEMA has made a commitment to purchase between 500 to 1500 seats of MapInfo Professional, MapInfo's flagship desktop mapping software, over the next 5 years. FEMA will also be able to purchase data, other software products, training, support and application development services through this contract. Source: <http://www.hdm.com>

Editor

3. It is interesting to note that GIS is having its first use in the Food and Consumer Service, USDA, according to Jim Aylward, Harvard Design and Mapping Company, Inc. (HDM). HDM was awarded a multiyear contract to develop and test a methodology for using GIS technology to examine the delivery of food and nutrition assistance program benefits to children and adults. HDM's approach enables FCS researchers to study issues affecting food assistance

participation levels. The study considers the participation levels of four FCS programs including the School Breakfast Program, the Child and Adult Care Food Program, the Summer Food Service Program, and the Special Supplemental Nutrition Program for Women, Infants and Children. The study focus is on improving access to FCS programs for children in rural areas. Source: Personal conversation with Jim Aylward (11/13/96).

4. Papers to be presented in the "Spatial Methods" session of the 1997 CDC and ATSDR Symposium on Statistical Methods include: P. N. Price - Predicting Pollutant Concentrations Using Spatial Modeling with Covariates and Monitoring Data; Deane W. Merrill - Analyzing Spatial Patterns in Health Outcome Surveillance Data; Michael Mungiole - Application of a Weighted Headbanging Algorithm to Mortality Data Maps; Linda W. Pickle - Exploring Spatial Patterns of Mortality Data: The New NCHS Atlas; and, Richard Hertzberg - GIS Displays for Multivariate Statistical Models of Toxic Response. **Editor**

B. Technical News

5. From **Jay Kim**, NIOSH: An Atlas GIS User Group meeting (ESRI-Washington, DC) was held in Du Pont Plaza Hotel on 10/24/96. Carmelle Cote and Margaret Hunter, ESRI representatives, presented the status of Atlas GIS in a new company in relation to ArcView, their flagship product. Most importantly, they announced that Atlas GIS will fully be supported in the future. A converter that changes agf files from Atlas GIS to shape files for ArcView was announced. It was also stated that with "ESRI productizing" of Atlas GIS, bugs will be fixed. They heard users opinion and would like to hear from all users including those who were not at the meeting. The ESRI user group will invite all registered users of Atlas GIS to their annual meeting in California in December. It remains undecided as to whether AtlasGIS users would become a part of the ESRI user group or constitute an independent group. Users can forward their questions, opinions, bugs, help request, etc. to:

mhuhter@esri.com and ccote@esri.com. or directly to support@esri.com. There is a page for Atlas GIS as a part of the ESRI home page: www.esri.com/atlas/support.

6. You may remember, or once used, the public domain raster-based GIS software Geographic Resources Analysis Support System (GRASS). It was developed and maintained by the U.S. Army Corps of Engineers- Construction Engineering Research Laboratories (CERL). It will no longer be supported effective this year. **Editor**

C. Internet News

(Selected items picked up from the Internet by GIS Users)

7. From **Karen Stakes**, PHS Library (picked up from multiple recipients of list MEDLIB-L): For a good introduction to desktop mapping and the latest news about TIGER and other data sources, visit: <http://www.wessex.com>; We offer a wide variety of mapping and demographic software and data, along with industry gossip. Our data is available in MapInfo, ArcView, SPSS, SAS, Excel and dBase formats. Samples, demos, software, manuals and utilities available for free download. Scott Elliott, selliott@mcs.com, <http://www.wessex.com>.

8. Picked up from <owner-ai-geostats@gis.psu.edu> (a) Tables of Contents for Geoscience Journals; To join the mailing lists of your choice [see ATTACHMENT to this edition], send a message to: list_manager@wwei.ucsd.edu with a join command followed by the list (use acronym only) you want to join. As an example to follow: From: Chuck Croner <c m c 2 @ n c h 0 9 a . e m . c d c . g o v > . . . T o : list_manager@wwei.ucsd.edu...Subject: <not needed>

join Geomeetings
join Am_Scientist
join EPSL
join Geology

To leave any of the mailing lists, send a message to:

list_manager@wwei.ucsd.edu with a leave command followed by the list (use acronym only). As an example to follow (as above): From: Chuck Croner <c m c 2 @ n c h 0 9 a . e m . c d c . g o v> . . . T o : list_manager@wwei.ucsd.edu...Subject: <not needed>

leave Am_Scientist
leave Geobooks
leave EPSL

Any questions or suggestions should be mailed to: gsi@wwei.ucsd.edu, Prof. Wuchang Wei, Scripps Institution of Oceanography, University of California, San Diego, CA 92093-0215

(b) I have been using geostatistics to represent spatial dependence of map uncertainty to understand the effects of map uncertainty on GIS applications. Here are electronic copies of recent work: <http://geo.swf.uc.edu/chuck/SDH96/paper.html> from Ehlschlaeger, C.R. & A. Shortridge (1996). Modeling Elevation Uncertainty in Geographical Analyses. Proceeding of the International Symposium on Spatial Data Handling, Delft, Netherlands. 9B.15-9B.25 and <http://geo.swf.uc.edu/~chuck/acm/paper.html> from Ehlschlaeger, C.R. & M.F. Goodchild (1994). Dealing with Uncertainty in Categorical Coverage Maps: Defining, Visualizing, and Managing Errors Proceedings. Workshop on Geographic Information Systems at the Conference on Information and Knowledge Management, Gaithersburg MD, December 1, 1994, pp. 86-91. Charles Ehlschlaeger, Assistant Research Professor, Department of Geography, University of Cincinnati, work: 513-556-2849, <http://geo.swf.uc.edu/chuck/> or email chuck@geo.swf.uc.edu;

(c) I can strongly recommend "Interactive Spatial Data Analysis", Bailey & Gatrell, Longman Scientific, 1995. This is an excellent overview of modern spatial statistical methods appropriate to either point pattern analysis, continuous data analysis, and area data analysis. There is also a very useful package that can be obtained from the authors for a nominal sum to undertake the analyses discussed in the book (or indeed, on your own data). Dr. Alan Kelly, E-mail

akelly@stats.tcd.ie, Lecturer in Biostatistics, Department Community Health & General Practice, Department of Statistics, Trinity College, Dublin 2, Ireland.

9. Picked up from <gis-l@urisa.org>: (a) The following mailing lists has been setup under our Asia GIS Discussion Series, for the discussion of GIS applications in the Asia Region. Currently, we have the following mailing lists available for subscription:

asia_gis Asia GIS Discussion Forum
hk_idrisi Asia IDRISI application Diss. Forum

You are most welcome to subscribe. To subscribe, send the following command:

subscribe list_name your_email_address
in the text body to the list server
majordomo@geog.hkbu.edu.hk

Send the command "help" or "lists" to the above list server will give you the command listing and other mailing lists available under this list server respectively. To send article to the members on that list, please send it to:

list_name@geog.hkbu.edu.hk

Thank you for your attention. Administrator, GEOG Mail Office, <http://www-geog.hkbu.edu.hk/geogmail>;

(b) MaconUSA has a nice data set for Europe available on CD in a variety of GIS formats. Check out their web site at www.maconusa.com. Source: Michele Fulk, Assistant Director for Programs, The IDRISI Project, Clark University, 950 Main St., Worcester, MA 01610-1477, phone: (508) 849-2311, email: mfulk@clarku.edu

10. From www.usgs.gov (March press release): The U.S. Geological Survey (USGS) reports that Pennsylvania is the first in a state-by-state series of digital topographic maps of the U.S. available on CD-ROM. The CD-ROMs, computerized images of USGS topographic quadrangle maps, in digital raster graphic (DRG) format, have been produced through a partnership arrangement with the Land Information Technology Company, Ltd., of Aurora, Colo. Topographic maps are among the most popular and

versatile products that the USGS produces. They depict natural and cultural features of the landscape, such as lakes and streams, highways and railroads, boundaries, elevation, and geographic names. Over the years they have been popular with the general public for outdoor, particularly recreational, uses and with scientists and engineers in support of research and technical applications. CD-ROMs for parts of Pennsylvania and Washington state are available, with full coverage of the U.S. expected by 1998, after some 57,000 USGS maps are converted to CD-ROM format.

"Topographic maps on CD-ROM are a new product for the USGS," said James R. Plasker, associate chief for operations of the USGS mapping division. "Through the data production agreement with Land Info and in partnerships with the states, the USGS has an opportunity to complete nationwide DRG coverage in the next two years." Each CD-ROM includes the USGS topographic maps for a 1-degree block. The USGS will also continue to print and distribute the paper topographic maps for which it is best known.

DRG versions of topographic maps are useful as a backdrop for other digital images. They have been used to collect digital cartographic data and to revise maps. When combined with digital aerial photographs or digital terrain models, DRG data can be used to produce hybrid products, such as image maps and shaded relief maps. Each DRG file has its own descriptive file that provides information including file identification, data sources and dates, scanning specifications and georeferencing information. Viewing software, product specifications, and assorted text files are also included on the CD-ROMs. Two viewing software packages are provided: Aerial View Lite image display software provided by Gary Mart and ArcView software from Environmental Systems Research Institute (ESRI) of Redlands, CA. The agreements among USGS, ESRI and Gary Mart to provide both data and software in a useful applicable format are typical of government-wide alliances with private companies to provide useful products and services to the public. For information on ordering DRGs on CD-ROM, contact any Earth Science Information Center or call 1-800-USA-MAPS. The

cost of each CD-ROM is \$32 plus \$3.50 handling on each order.

III. GIS Outreach

(Editor: All solutions are welcome and will appear in the next edition; please note that the use of trade names and commercial sources that may appear in *Public Health GIS News and Information* is for identification only and does not imply endorsement by CDC or ATSDR)

☛ **Cathy Cubbin**, NCHS Research Intern, sought Users input (October edition) on a GIS project concerning the identification of socioeconomic measures meaningful at the Health Service Area (HSA) level. She plans to layer HSA death rates with other types of data, i.e. behavioral, social, economic, and environmental.

✓ **RESPONSE** from **Dennis Groce**, NIOSH: "I suggest that one layer of analysis be the number of persons employed by Standard Industrial Classification (SIC) for each HSA. Judicious choice and grouping of SIC's (e.g., metals industries, mining industries, chemical industries,...) could yield insightful analyses."

☛ **Tom Richards**, PHPPPO, sought Users input (October edition) on a GIS project to map local health department jurisdictions in the U.S.

✓ Tom shares the following email and his thanks to **Jerry Curtis**, NCEH: "I greatly appreciated your taking the time to demonstrate how you used Maptitude to display census information about housing for purposes of planning childhood lead poisoning prevention programs. As I was looking at your maps, I began to wonder whether some of the information that you have on housing might be useful as part of Ed Vaughn's local health department AIM project (and so, to alert him, I am including a copy of this email to him).

In response to my inquiry, **Bill Henriques** from ATSDR also phoned me, and indicated that, if LHD boundary file maps were developed, ATSDR would be interested in using them (e.g., as part of mapping health education and communication efforts). I met this morning with ATSDR staff (**Janet Heitgerd**,

Virginia Lee) about their TIGER files. At ATSDR, they have (and use) both Arc Info and Map Info Professional. However, Virginia Lee indicated that she had just purchased Maptitude, and was starting to explore its use -- since it seemed to have many good data files, and at least one state (Washington) has started to use it. In response to my 'ad', I have also received an email (that I still need to follow up) from: Les Becker , Maryland Division of Injury and Disability Prevention; and from **Richard Hoskins** (Washington State Department of Health). Thanks again." Tom Richards

IV. Special Reports (Submissions are open to all)

A. Profile of LANDVIEW II (Originator: Environmental Protection Agency, Office of Solid Waste and Emergency Response (OSWER), Chemical Emergency Preparedness and Prevention Office): LandView II is a geographic display system, published on eleven CD-ROM discs, and can be used on a standard personal computer. The information that LandView displays in maps and tables combines summary information from five EPA databases (AIRS, BRS, CERLIS, PCS, TRI) with geographic features from TIGER/Line files and statistics on demographics and economics from the 1990 census. While LandView lends itself to a myriad of applications, two principal uses will be to help local communities evaluate environmental risks and identify areas of concern for environmental justice. LandView is the product of a collaboration among EPA, the Bureau of the Census, and NOAA. It is available to the public through Census sales. Purpose: Emergency planning and response for local entities and information management for community right-to-know and environmental justice analysis. For more information about the Landview GIS product, contact Dorothy McManus, EPA/OSWER/CEPPO, 401 M Street, SW, Mail Code: 5101, Washington, DC, 20460, 202-260-8606 (voice) or 202-260-2854 (voice mail) - available 24 hours a day, 7 days a week. For ordering LANDVIEW, contact: Larry Carbaugh, Bureau of the

Census, Customer Service Branch, Washington, D.C., 20233, or view webmaster@census.gov. Order Process: System is available for purchase from the Bureau of the Census, Customer Service Branch (301-457-4100) and costs \$95.00 for one disc, \$795 for the complete set of 11 CD-ROMs. Technical Prerequisites: Application Software: -Operating System: - MS DOS- Hardware Platform(s): - IBM PC LAN Compatible - IBM PC Standalone. **Editor**

B. Russian satellite strength equals US: The latest news on the Russian satellites is that 24 are operational, similar to that in the U.S. Navstar Global Positioning System (GPS) constellation. There is essentially 4-satellite visibility anywhere on earth (above the horizon) at any time, allowing intelligent GPS receivers to solve four equations to determine latitude, longitude, height and time instantly. Although differential GPS accuracies will remain the same, visibility will be much improved. The Russian Global Navigation Satellite System (GLONASS) is also a military system with the first satellite launching in 1982. The U.S. first launched a satellite in 1978. As you may recall, U.S. satellites have been launched from Cape Canaveral. Russian satellites are launched from Bajkonur, central Asia. The implications for GIS/GPS readings for public health investigations in remote areas are good, and will improve in time as clock, frequency and coordinate differences are overcome with receivers serving both systems. One company, Ashtech will market a receiver that integrates GPS and GLONASS.

The GPS industry is expected to grow to about six billion dollars in year 2000, where civilian uses will far outweigh military uses. Many uses are being evidenced including surveying of legal boundaries, integration of in-the-air route and on-the-ground civil airport navigation, real field time correlation of crop yields with soil maps and fertilizer applications, route finders in vehicles with receivers supported by digital maps and databases, locational referencing for hikers and any other locational applications requiring a relatively open sky. [References: J.P. Reilly, The Russian GLONASS Satellites, P.O.B. (Point of Beginning), 21(8), July, 1966, pp. 27-42; see A. Leick,

GIS- A National Asset and Treasure at website <www.spatial.maine.edu>, and; website <www.ggrweb.com> for papers and discussions on GPS and DGPS (Differential Global Positioning Systems)]. **Editor**

C. Mapping Science Committee, Board on Earth Sciences and Resources, Commission on Geosciences, Environment, and Resources, National Research Council-- **“Spatial Data and Health”**: This is a proposed activity that would be jointly pursued by the Mapping Science Committee and the Institute of Medicine. Project approval is pending and no current resources exist to initiate the activity. Once approved through the Governing Board on the National Research Council and funding is obtained, the responsible committee would be appointed and the activity would commence.

Summary: In the context of ongoing changes in health care delivery in the United States, efforts to match health resources and health needs at the local level are critical to ensuring access to quality health care for all people. To succeed in these efforts, decision-makers require spatially-defined health information that can be linked to social, demographic, and environmental data for small geographic areas. Currently the effectiveness of this process is hampered by the diversity of geographic scales (geocodes) attached to health information and the geographic incompatibility of the geocoded health information with other information to which it must be linked. By bringing together experts from the mapping science and public health communities, this activity probably will explore methodological, ethical, and policy issues in the geocoding and use of spatial data for analyzing health and health care delivery.

Policy Context: The past decade has seen rapid change in health care delivery in the United States and in the problems facing public health. The growth of managed care, coupled with deepening fiscal constraints in the public and private sectors, are reshaping the nature, structure and location of health services. At the same time, there is increasing concern about a wide range of health problems, including the impacts of changes in health care delivery on vulnerable populations, the effects of environmental

and social conditions on health, the wide and persistent disparities in health status within cities, and the spread of new and emerging diseases. Addressing these issues requires a detailed understanding of geographic variation in health, the links among health, social and ecological issues, and the effectiveness of health services for meeting community needs.

Geographic information systems (GIS) and large, spatially-referenced data bases form a powerful information and analytical base for addressing such issues. They enable the analyst to integrate information on health needs, outcomes and service provision for small geographic areas and link that information to environmental, social, and economic data for new kinds of analyses. Fueled by technological advances in computing, the number, size, and complexity of spatial data sets has exploded in recent years. Moreover, as the National Spatial Data Infrastructure (NSDI) develops, vast amounts of information, including health information, will be available in geographically-referenced data bases. These data bases will typically be managed by federal, state, and local agencies and disseminated widely through the internet and other means. As these systems develop, it is critically important that health data be integrated with other types of spatial data and that it be provided at a scale and in a format that will allow important policy issues, like the ones noted above, to be addressed.

In this context, a dialogue between mapping scientists and health decision-makers would be beneficial. It would provide a forum for examining current issues of mutual interest and lead to the development of a document that critically assesses the role of geographic information and analysis in health research and policy-making. The topics to be addressed include: (1) the potential of spatial data and analysis for addressing current issues in health and health care delivery; (2) geographical, ethical, structural, and political constraints on the use of spatial data in health analysis; and (3) improvements in geocoding, data management, and spatial analysis to enhance the use of spatial data and GIS by health agencies.

Technical Context: Any group interested in the

health of a local population must be able to integrate three types of spatial information: (1) data on the location of human events -- births, deaths, diseases, etc., (2) data on service providers linked with information on types of services offered, costs, caseloads, etc., and (3) data on individuals who use services including address, demographics, services received, diagnosis, etc. Knowledge of such geographical patterns can be a basis for planning more effective programs of services, for monitoring public health, and for better understanding the causes of health and disease. The common method of examining the geographical pattern of such events is by mapping them in political or administrative units such as counties, census tracts, or zip codes. Increasingly, however, there is interest in establishing the existence of geographical clusters of events independent of these spatial units and in monitoring interrelated changes in the geographic patterns of health and environmental conditions and people at risk.

In an optimal setting, a geographic information system (GIS) would become a spatial decision support system. Such a system would integrate analytical models, data base management, graphical display, and report generation in an iterative, man-machine interactive setting. At a minimum, a set of GIS tools linked to an integrated data base should enable the user to conduct exploratory spatial analysis. In a more sophisticated environment, the GIS would enable the user to evaluate a set of alternatives, select the best alternative, implement the system or plan, and monitor the results.

Although health agencies are increasingly relying on GIS and spatial data, several challenges exist to effective use and implementation. Much health information is not available at detailed spatial scales because of confidentiality and privacy restrictions. This reflects past practices where data was coded for reporting purposes rather than for monitoring disease patterns and assessing the appropriateness of locally available health services for addressing those health problems. The aggregated nature of health information can hide significant spatial variation and make it impossible to identify geographical clusters of events. Aggregate data are also difficult to relate to

point and linear features such as highways, hazardous waste sites and health facilities, since the population at risk and disease outcomes are averaged over large geographic areas. Currently some researchers in the mapping science community are developing methods for preserving geographical detail in spatial data, while obscuring the precise geographical referents that violate confidentiality. However, input from health analysts is needed to ensure that these methods are consistent with the ethical, legal, and political realities of health information and to critically address data aggregation issues.

Another problem is the diversity of geocodes attached to health information. The geocode defines the geographic location, area, or feature associated with a particular data item. Different types of health data are collected and made available with different geocodes. For example, much federal health data is only available at the county or state level, while hospital discharge data is often provided at the zip code level. In contrast, state and local health departments are increasingly recording and analyzing data for point locations, i.e. vital statistics records and cancer registry data.

The diversity of geocodes can make it difficult to link health data sets, since areal units typically do not match or aggregate perfectly. In studying the effects of air pollution on asthma, for example, one might need to relate hospital utilization data by zip code with pollutant emissions from point sources, and census information on race, ethnicity, and economic status by census tract. These data layers not only have different spatial resolutions, but also different rates of error and variability. There is a need to analyze the diversity of geocodes associated with health information, the problems created by such diversity, and the advantages and disadvantages of providing health data at finer spatial scales.

A third issue concerns the role of spatial data in the context of new models of health care delivery. The growth of managed care means that much valuable health information is collected by private and non-profit groups. At the same time the federal government, under Executive Order 12906, has mandated the development of the National Spatial

Data Infrastructure (NSDI) which will incorporate all spatial data holdings, including health data. The proliferation of privately-held data in the context of the growing federal role in providing and coordinating spatial data and monitoring health outcomes raises several important questions. What is the place, if any, in the NSDI for health data from private and non-profit health care organizations? How might partnership or other agreements be structured so that important privately-collected data can be incorporated in the NSDI?

In addition, the emergence of new models of health care delivery brings new and/or changed responsibilities for public health agencies. These responsibilities include, among others, the responsibility for monitoring and analyzing the impacts of changes in health care delivery and financing on vulnerable populations for example, persons without health insurance, elderly, children, and inner city residents. Such impacts are likely to vary spatially, reflecting state and local differences in health policies and service availability, as well as variation in social, economic, and environmental conditions. Addressing these issues calls for a detailed understanding of changes over time in health status in small geographic areas and the relationships of such changes to the availability, accessibility, and appropriateness of health services in local areas. How can the NSDI and geographic information systems best be structured and utilized for analyzing these topics? Editor- source: <http://www2.nas.edu/besr/2132.html> (contact Tom Usselman, Director, Mapping Science Committee, National Academy of Sciences, (202) 334-3349 or email: usselman@nas.gov).

V. Public Health GIS Literature

(This section may include literature citations, abstracts, syntheses, etc., and submissions are open to all)

Selected Abstracts from the 1996 GIS/LIS Denver Meetings

□ A Methodology Using U.S. Toxic Release Inventory Information to Identify High Risk Areas and Other Human Health Concerns- For several years there has been a need to identify certain areas that contain high

levels of toxic pollutants. This need is driven by environmentalists, the general public and by public health and planning groups. As a result, the Environmental Protection Agency (EPA) developed legislation titled The Community Right-to-Know Act and in 1986, the act was approved by congress. A portion of this act included constructing and maintaining a database called the Toxic Release Inventory (TRI). This database is updated annually and every factory/company that meets a threshold use level of one or more of the chemicals listed by EPA is required to submit operating information. The amount of information required is significant and ranges from name and address of the factory to total pounds of chemical released. TRI data can be used to geographically pinpoint areas that have high levels of toxic chemical use and possible elevated levels of pollution. Integral components for this are facility address, chemical name, total pounds released and latitude/longitude coordinates. Once this is determined, then specific areas can be identified by chemical and mapped. With the advancement of geographic information systems (GIS), models can be constructed that will allow for many types of analyses to be performed. Once the TRI polluting facilities are defined, then profiles of the zones can be created and classified using a variety of additional data sources. Another feature which greatly adds to the importance of using a GIS are geocoded data overlays. This will enable public health coordinators, city planners, real estate developers and federal officials to implement solutions/policies that benefit the community in terms of environmental and human health effects. Paula Kingsbury, Masters of Science student, Salem State College, Salem MA., 7 Gould Street, Wakefield, MA 01880, sisters@tiac.net.

□ Assessing Environmental Equity in Massachusetts Using GIS- Many lines of evidence indicate that minority and low-income populations are often exposed to unequal share of environmental hazards in their communities. This disproportionate distribution of environmental toxins has become a focus of heated political debate, an area of intensive scientific research, and a top priority of the U. S. Environmental

Protection Agency. This paper presents the result of a study on the magnitude of environmental inequalities in the Commonwealth of Massachusetts. We first analyzed the spatial relationships between relevant demographic characteristics and locally unwanted land uses such as solid waste disposal sites, underground storage facilities, and highly polluting industries. In addition to these indicators of pollution, we also analyzed the amount of protected open space and other areas of critical environmental concern such as priority habitats, wetlands, and drinking water protection areas in relation to income and racial differences of the population. Environmental inequalities were also evaluated by examining cleanup efforts and damage awards (for violation of environmental regulations) with respect to the social and economic differences of communities. In addition to this comprehensive analysis of spatial relationships, we will discuss ways of separating spatial associations of environmental hazards and minority and low-income populations as a result of urban decay from those due to our unfair economic and environmental policies. Jean-Dominique Herve Anoh and Zong-Guo Xia, Environmental Sciences Program, University of Massachusetts at Boston, 100 Morrissey Boulevard Boston, Massachusetts 02125-3393, Phone: (617) 287-5285, E-mail: jdha@earth.geog.umb.edu.

□ Identifying Resource Data Along the U.S./Mexico Border: The Transboundary Resource Inventory Project- Under a Grant from the Federal Geographic Data Committee, the Transboundary Resource Inventory Project (TRIP) conducted four binational workshops along the U.S. / Mexico border to identify existing data, data needs, and data gaps in the region. Surveys were sent to government and non-government agencies and offices in the United States and Mexico that are mandated to collect and disseminate resource data, and to manage resources in a 100 mile buffer along the border. Participants from these agencies and offices were invited to attend workshops in San Diego, Tucson, Reynosa, and Ciudad Juarez to prioritize these data needs. The mood of the workshops was to create an environment for collaborative data sharing toward developing a region-wide transnational GIS from San

Diego/Tijuana to Brownsville/Matamoros, including off-shore marine jurisdictions. The immediate goal of TRIP is to promote acquisitions of GIS framework data and adoption of mapping and metadata standards at scales commonly used by both nations. The four U.S. border states (California, Arizona, New Mexico, and Texas) comprise TRIP. It is governed by a Board of Directors and has organized several working committees to advance these goals. TRIP neither seeks nor dispenses project funding, but serves as a facilitator for advancing projects and transboundary collaborations. A Mexican counterpart to TRIP, encompassing the six Mexican states on the border, is being formed with similar goals. Amelia Budge, Stan Morain, Richard Wright, Earth Data Analysis Center, University of New Mexico, 2500 Yale S.E., Suite 100, Albuquerque, N.M. 87131-6031, (505) 277-4000, abudge@spock.umn.edu.

□ Application of GIS in Environmental Epidemiology: Assessment of Progress and Future Trends-- Understanding the complex spatio-temporal relationships between environmental pollution and disease and identifying exposures to environmental hazards in high-risk populations are essential elements of an effective environmental and public health management program. Modern computer technologies, such as geographic information systems (GIS), provide cost-effective tools for evaluating interventions and policies potentially affecting health outcomes. GIS analysis or display of environmental health data is also helpful in explaining disease patterns in terms of relationships with social, institutional, technological and natural environments. This paper examines major issues related to the application of GIS in environmental epidemiology. Specifically, the paper presents and discusses the potential benefits, and major limitations of GIS in environmental epidemiology. Details of a prototype system developed to facilitate management, analysis, and presentation of environmental, socio-demographic, and health outcome data is presented. From an example application and case study, it is concluded that GIS can significantly add value to environmental and public health data in areas such as: exploratory data

analysis, generating etiologic hypotheses, and decision-making. The widespread adoption of GIS in environmental epidemiology, however, is constrained by issues such as inconsistent spatial scales of the data, data quality and currency, lack of appropriate statistical functions for data analysis and interpretation, and data security and confidentiality. Chi-Chuan Chen, 134 Davidson Hall, Agricultural & Biosystems Engineering, Iowa State University, Ames, Iowa 50011, Tel: (515) 294-3153, E-mail: ccchen@iastate.edu.

□ GIS for Modeling of Chemical Contaminants on the Mexico/U.S. Border: This presentation is intended to convey the results and implications of an effort to develop binational geographic databases as a foundation to address several environmental problems that span the international border. In this binational, multi-agency setting, data collection and validation, analysis, the reporting of results and the policy implications of results are subject to intense scrutiny from several scientific and policy perspectives. The research addresses issues in the development of alternative contaminant dispersion models which are applied to actual test sites in Ambos Nogales. Over the last year, we have developed a vulnerability assessment based on a simulation of the movement pathways of dense gaseous contaminants correlated to demographic characteristics. An initial simulation for an evacuation due to an industrial contaminant release has been done. The results determined and mapped the initial isolation zone and the downwind protective action zone. The results indicate the nearest evacuation shelters and the shortest paths for evacuation along the street network under a dynamic constraint of increased street congestion. In the Mexicali/Colexico region, we are focusing on the database and modeling effort in the U.S. area of the Imperial Valley. Our intent is to create and verify the NLEAP-based methodology for a GIS analysis of the spatial distribution of contaminants using the more readily available data in the Imperial Valley. Since the environmental conditions, agricultural products and cropping practices are very similar south of the border, we feel that the model relationships will have

applicability there as well. However, the lack of sufficient access to data and analysis of the levels of environmental contamination in the area south of Mexicali creates the need for a different strategy of investigation. George F. Hepner, Department of Geography OSH 270, University of Utah, Salt Lake City, UT 84112, george.hepner@geog.utah.edu, phone: 801-585-3155, and Zhaodeng Feng, Assistant, Montclair State University.

□ GIS Applications in the San Diego-Tijuana Interface: A GIS for the San Diego, California-Tijuana, Baja California Norte region is being prepared by researchers at the Center for Earth Systems Analysis Research, San Diego State University. With a population in excess of four million, the San Diego - Tijuana region is the most populous and rapidly growing region along the United States - Mexico border. Rapid population growth and urban expansion, and industrialization have led to the deterioration of natural resources and to an increase in environmental degradation. The transborder GIS is being employed to address a set of environmental concerns including the loss of biological diversity, increasing air pollution, and a decline in the quality of surface water and groundwater. This paper will detail the development of the transborder GIS, describe its use and evaluate its suitability for addressing several applications. Specific applications to be discussed are: 1) Cross-border vegetation mapping and data integration 2) Analysis of population and housing expansion in Tijuana 3) Modeling industrial emissions of air pollutants, and 4) Modeling particulate matter produced by vehicles in Tijuana. Richard D. Wright, Ernst C. Griffin, Christopher Brown, Stephen McElroy, Matthew Brown, and Anne Obee, Department of Geography, San Diego State University San Diego, CA 92182-4493, (619) 594-5466 or email: wright@typhoon.sdsu.edu.

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VI. Related Census, DHHS and Other Developments

Excerpts from the June 5-6, 1996 meeting of the NATIONAL COMMITTEE ON VITAL AND HEALTH STATISTICS, Public Health Service, Washington, D.C.:

REPORT FROM NCHS AND DISCUSSION WITH NCHS DIRECTOR

Dr. Sondik said he is a strong advocate for involving the community in the activities of the Department, a priority that points to the importance of the National Committee. He then briefed the group on the status of various NCHS projects. The survey integration process is working well, bringing health surveys together with the National Health Interview Survey (NHIS) as the hub. This has been needed and desired for a long time, and is a major step in the right direction. "Current flow" in receiving vital statistics data is a related priority, and information systems are being revamped so information can get to the community on a more timely basis. He cited several examples of survey data that are out considerably sooner than in the past: preliminary 1996 mortality data, final 1994 mortality and natality data, and 1994/95 Disability Survey data. One goal is eventually to have statistics available on almost a continuous basis.

This is an aspect of communications, an area to which Dr. Sondik attaches great importance. He noted that a sea change in this regard is the new adjunct to the White House Home Page, called Briefings Rooms, which present up-to-date statistics in various areas. The content of the statistics is exclusively the province of the agencies responsible for them. The pages link to huge information repositories through hypertext. Another NCHS priority is the transition to ICD-10, which Dr. Sondik noted is a major and critical change that requires hard work. The process is on track.

He hailed the formation of the Data Council, which brings together principals from all HHS agencies to deal with issues that in the past have only been addressed in a piecemeal fashion. The National Committee has an important role because it advises the Data Council and will work closely with it. A particular challenge for both bodies is to monitor the health care system as it undergoes fundamental change. The issues of standards and communication are critical in this regard, because of the need to counteract proprietary attitudes toward data.

Another major challenge is the need to work simultaneously to understand both "the forest" -- the large picture -- and "the individual trees or groves of trees." For example, states need information on

themselves, and national samples are not adequate. This must somehow be accomplished with diminishing resources.

The third challenge identified by Dr. Sondik is in the area of genetics, a major issue at CDC and one that raises complex ethical, privacy and confidentiality questions. Finally, Dr. Sondik gave a brief summary of the background that brought him to his current position. His operations research training led him to statistical work on large public health projects, which brought him to the Heart, Lung and Blood Institute and eventually to the National Cancer Institute, where he was involved in the SEER Program. In that context, he said, he learned about the grassroots collection, processing and analysis of information.

UPDATE ON DEPARTMENT DATA ACTIVITIES:

Overseeing and developing departmental data collection strategies. In this area, the Department is focusing on rethinking and integrating its surveys, with the NHIS as the nucleus.. The Department is also looking at the issue of state-level data and the role of the federal government in regard to it. Regarding survey integration, Mr. Scanlon said that the Medical Expenditure Panel Study (formerly the NMES) has already started, using the NHIS as a sampling frame. It is expected to be a continuous survey. NHANES is also part of the survey integration plan and will be based on the NHIS sample as well. The Council is looking at how to consolidate the Department's employer surveys and also its provider surveys. In the latter area, Mr. Scanlon asked for the Committee's advice. Provider surveys need to be done across settings, including managed care settings, and this is not easy. HHS is rethinking its surveys and analytical databases on providers, health care resources and capacity and on the public health infrastructure, to address emerging needs and to make more effective use of the databases.

The survey integration plan also covers state level data. The plan is for most national surveys to include an element that states can buy into to get state data. The Council is early in its thinking about state data, and Mr. Scanlon stated that this is an area where

advice from the Committee would be helpful. He said the integration plan also includes provisions for Department-wide data sharing, access and dissemination policies.

Serving as the departmental focus for privacy and confidentiality issues. The Department has established a Working Group on Privacy, which Mr. Fanning chairs. That group is looking at national legislation on medical records privacy and legal protections for computerized health records, among other things, and has completed a bibliography of best practices for protecting privacy in an electronic environment.

Serving as a forum regarding health applications in the National Information Infrastructure (NII). Although medical care applications have made the health area "one of the more glamorous" ones in the NII, public health has been "a poor cousin." There are few Internet applications in the public health area, and the Data Council will try to strengthen it. It has established a federal agency-wide telemedicine working group and is developing approaches for enhanced health information for consumers through computer-based applications.

Serving as a forum for HHS data policy considerations and the development or review of legislative proposals, and as a liaison point for relationships with external organizations. In addition to assessing legislative proposals and identifying emerging issues in health information policy, the Data Council is looking at the international health data arena and trying to coordinate HHS activities in this area.

Dr. Zill described this report as encouraging, and asked if there were plans to coordinate with the Census Bureau in enhancing state-level data, since it is working on a continuous measurement system. Mr. Scanlon said there would indeed be efforts at close coordination. HHS will also be looking at other federal agency holdings and survey mechanisms to support state- and community-level data. Dr. Zill noted that while telephone surveys are a cheaper way of getting the large samples needed for state estimates, they miss a sizable segment of the low income population. (Twenty-four percent of low-income

families with children have no telephone.) Another group that would be missed is the nonresidential population. He also recommended methodological work on enhancing telephone surveys through modeling, to ensure coverage of all segments of the population. Mr. Scanlon said this is a focus of the proposed methodology study of state estimates from the NHIS. Dr. Zill noted that supplementary studies focusing on the non-covered group may be helpful for state modeling.

Ms. Leatherman called the formation of the Data Council a sentinel event for informing and rationalizing areas that emerged in the health care reform debates, and for revitalizing and redefining the National Committee. She inquired about the Council's hopes and thoughts on operationalizing the relationship between the two bodies.

Mr. Scanlon said the Council welcomes the Committee's thinking on this question, and he mentioned a few ideas. In regard to managed care data, the Committee could help sharpen the issues and help identify issues for the Department to address. On standards, the Committee can bring the Department "the best and latest thinking from the outside world" to facilitate partnerships. Regarding data gaps and data collection strategy, the Department particularly welcomes advice on rethinking the current portfolio on provider surveys. The Committee's perspective is also needed on privacy issues, to augment Mr. Fanning's work. If telemedicine and consumer health information become priority areas for NCVHS, the Department is looking for ideas there as well.

Mr. Van Amburg praised the state-oriented facets of the Data Council's work plan, and asked if there were any thoughts of developing survey components in small modules that states could pick up as needed if they don't need the whole National Health Interview Survey. Also, he asked if there would be resources for states to use to design their state samples differently from the national sample. Mr. Scanlon said these were good ideas and he would take them back to the group. Mr. Van Amburg noted that tailored surveys would offer states a standard set of questions and analyses on given issues.

Ms. Jones expressed concern about the

ramifications of the separation of the Social Security Administration from the Department. She reported that a problem has resurfaced that the Committee thought had been resolved: unless they do eligibility determination for SSDI and SSI, states do not know who is eligible for Medicare and Medicaid until the bills show up, because of the new way that people are assigned Social Security Numbers. This, she noted, is not good management, at a time when states need to know who is getting and who is eligible for services. The MTS will provide this information, but not for some seven years. She urged that the Department take over this issue, and Mr. Scanlon said the Council would follow up. Noting that the Data Council needs to include SSA in its activities in general, she encouraged at least an informal relationship between them.

Dr. Sondik urged further attention to Ms. Leatherman's comments about the relationship between the Committee and the Council, and concerted attention by the Data Council to minority statistics and the impact of system changes on vulnerable populations.

SECRETARY'S RESEARCH AND EVALUATION PLANNING INITIATIVE

Two major themes of equal prominence have emerged: the inevitable loss of data as a result of the changes underway in the health world, including devolution; and the need to make better use of administrative data. Regarding the first theme, Dr. Raub observed that the transaction information that has been a cornerstone of evaluative efforts is becoming harder and harder to get. A parallel trend is the devolution of responsibilities to states and localities through block grants, which is reducing the federal government's influence on record keeping and reporting requirements. Thus, information that once was counted on for evaluation will no longer be available.

CONFIDENTIALITY LEGISLATION -- UPDATE

Mr. Fanning (new Chair, Interagency Working Group on Health Privacy Issues) said the principal focus of the Privacy Advocate position is to ensure

that new policies and legislative proposals take privacy issues into account. He added that a major task will be "to persuade people ... that maybe the activity can be conducted without collecting personal identifiers." He noted that HHS is now the only Federal department with a formal position to promote privacy at the departmental level. The IRS also has such a function. The U.S. is unusual in the developed world in not having a government-wide privacy advocacy activity. The Privacy Working Group of the President's Information Infrastructure Task Force has been analyzing possibilities for a government-wide activity in this area, but for the time being this will remain a "cottage industry."

Regarding pending legislation, Mr. Fanning called attention to the Bennett Bill (S1360), introduced last fall and being worked on by the Senate Labor and Human Resources Committee. The Department has met informally with that Committee to offer technical comments on the bill, which it generally supports. He noted that there is always concern about how such bills will affect disclosure for research purposes. This one in its current form is acceptable in that regard. He stressed the recurring theme of the need to inform and educate people, in this case in regard to the need for identifiers.

Another bill, introduced by Congressman McDermott, is "not very helpful" for research in that it provides for individuals to make their records unavailable for research and other uses. In addition, the House Government Reform and Oversight Committee is developing its own bill, on which it will hold hearings soon.

Ms. Frawley said the hearing would be June 14. The bill in question is a combination of the Condit and Bennett bills. The same subcommittee has jurisdiction over both the McDermott and Condit bills. She said the Committee should be concerned about the former because Congressman McDermott has stated on the floor of the House his concerns about administrative simplification and the absence of protections for health information. She said she has serious concerns about it and the possibility that some of its language will be pulled into the conference language. For example, it prohibits the use of the Social Security Number as an

identifier, and would completely inhibit the use of health information for research. It also has strong language about providers' ability to computerize record systems, because patients can restrict their providers from storing their information electronically. She added that what patients should be concerned about is that their information is protected, and available as needed at the point of care.

Ms. Jones observed that bills such as these are driven by "isolated examples of mischief ... and horror stories that get embellished over time," rather than by a sense of the norm and a search for ways to penalize or prevent future malfeasance. Their supporters tend not to understand how information is used in care. Also, insurance issues and information issues become intertwined, so that insurance underwriting practices are inappropriately addressed by restricting information flow. She asked for good brief articles explaining these issues.

Mr. Fanning then briefed the group about a proposal in the House Government Reform and Oversight Committee to create a single national statistical agency. The Administration has said that this would not be a good idea, and suggested that some of the same effects could be achieved by rewriting the confidentiality statutes to permit statistical agencies to share information. The term "enclave" expresses the notion of a "fence" around the statistical agencies whereby information could go in and be used, but could never come out. The congressional committee has not taken action on this matter. Ms. Jones said some people are resistant to this idea because they perceive it as "big brother government," and Mr. Fanning noted that in fact, research and statistical uses are "totally benign" and simply the place where people "tend to take out their privacy consciences." He again stressed the need to explain how such information is used and not used.

Subcommittee on Health Statistics for Minority and Other Special Populations

Dr. Williams reported that the Subcommittee met on June 4. One agenda item concerned race and ethnicity data for Medicare and Medicaid managed care populations. Two HCFA presenters outlined the

issues and said the data will not be available to monitor impacts on minority populations for several years. The Subcommittee also was briefed on an aspect of the OMB review of its race and ethnicity guidelines, a Bureau of Labor Statistics supplement to the May Current Population Survey. The supplement was sent to 60,000 households, divided into four subsamples on which four different ways of asking the race and ethnicity questions were tested.

The findings included these: Most Hispanics prefer Hispanic to be a racial question, but a combined race and ethnicity question reduces the size of the Hispanic population by about 20 percent. Thus, it is unlikely to happen. Another finding was that people who self-identify as multiracial, given the option, total only 1.5 to 1.6 percent of the population. The presence of this category reduces the size of the American Indian population dramatically. Roderick Harrison from the Census Bureau also briefed the Subcommittee on two large Census studies looking at the same issues in greater detail.

Olivia Carter-Pokras then reported on state activities in regard to the multiracial category. Georgia, Michigan and Indiana have passed legislation requiring multiracial status on all state forms. Illinois and Ohio require it on all school forms, and nine states have legislation pending to require multiracial status. There are two major concerns about these developments. One is the laws' reallocation rules, which in all states require that people in the multiracial category be reallocated to the OMB categories for federal statistics on the basis of the racial and ethnic distribution of the state population. It is known that the multiracial population does not have that composition. The second issue concerns the health implications for multiracial persons. All the state laws to date and all proposed state laws ask only for multiracial status, with no supporting detail about the race of the parents. Because the race of the mother makes a difference in the risk of low birth weight and infant mortality, among other things, it is important to know the race of both parents. The Subcommittee also heard a report from David Cantor of Westat on a study for NCHS of multiracial mothers and how they think of race and come up with the race of their

babies.

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Dr. Chen brought out the serious gaps in data (Asian/Pacific Islander) for the health issues of this population. For example, Healthy People 2000 had markedly fewer objectives for the Asian/Pacific Islander population because of the absence of baseline data. He stressed that the emphasis should not be on national data because the population is not distributed evenly across the nation. Eighty percent live in 10 states, and often in a small section of each state. Given the regional concentration, attaining a national standard is not an appropriate precondition for gathering information. Another issue is that two-thirds of the Asian population speak a language other than English at home, and in this regard Dr. Williams noted the proposed legislation that would make English the official language of the federal government, thus squashing attempts to translate questionnaires. He noted that given the complexity of these issues, it is important to draw on the expertise of people outside the Department.

Finally, he reported that Dr. Thompson had alerted the Subcommittee to the fact that federal contracts that enable Indian tribes to offer health services to their populations exempt them from federal confidentiality requirements. The Subcommittee plans to study this issue.

The group discussed the difficulties states are having implementing the sweeping legislation on multiracial status. In regard to the need for greater detail on racial origins, Ms. Jones predicted that health plans would find they needed this information when they start looking at outcomes.

McDATA AND STANDARDS ACTIVITIES

Dr. Iezzoni noted Mr. Moore's earlier comment about unnecessary data that could be gotten rid of.

She expressed concern about the trend, in capitated payment systems for managed care, of no longer recording information about diagnosis, even as HCFA is funding research on better ways to adjust for patient risk. Encouraging plans to care for sick people requires diagnostic data that are regularly updated. The major concern is that HCFA will have no way of knowing about healthy people who enroll in the capitated plans and then get sick, so as to track whether their managed care plans are continuing to care for them as they develop heavy burdens of illness. Mr. Moore agreed that some way is needed to identify the conditions of patients in the plans, but he does not know what it will be.

Dr. Buck predicted that the two diagnoses allowed in the minimum data set would prove inadequate, as would the single procedure code. It will be impossible to do any risk adjustment or pursue any test methodologies with such scanty information. A precedent is the early CHAMPUS experience, when the initial set of some five diagnoses and procedures was found to be inadequate.

Ms. Jones noted that another need for more information is to properly compare fee-for-service and managed care, so they are not compared only on the basis of spending with the assumption that lower spending automatically means poorer care. Also, longitudinal studies cannot be conducted without more data. Furthermore, even if the states do not want to collect a lot of data, the clinicians are going to need it.

Asked what information the plans would report to Medicare and Medicaid, he said Medicare managed care plans are not reporting any encounter data at present. With Medicaid plans, there is a mixed situation and limited cooperation because of different attitudes among waiver states. At worst, they either get no encounter data from the plans, or say what they get is all "trash" and refuse to pass it on. Some states raise questions about whether there will continue to be a federal role in Medicaid.

Turning to the subject of standards, he (Mr. Moore) reported that HCFA has limited funds to send representatives to standards development organization (SDO) meetings. The Agency is focusing on moving the transaction sets for administrative transactions into

the X12 format. HCFA is "very big" in electronic media claims, but in the past has permitted 400 different formats. It recently informed its contractors that beginning in July, it would only accept claims in three formats. This may help move other insurers in the direction of standards. The ultimate goal is to use only the X12, and the providers have been encouraged to move in this direction, toward the day when there is only one standard claim format.

CANCER REGISTRIES AND RELATED DATA

Dr. Edwards showed mortality rate trends between 1973 and 1993 indicating that cancer is going up and heart disease is going down as causes of death. She described NCI's Surveillance, Epidemiology and End Results (SEER) program, which was established in response to the National Cancer Act of 1971. The Institute uses SEER to monitor trends in incidence and survival, getting its mortality data from NCHS. Dr. Edwards briefly reviewed the history of cancer surveillance, which began in 1937 with prevalence surveys. The End Results Program was created in 1956 to focus on cancer survival, and later became the SEER Program.

This program has an interest in looking at etiology, stage of disease and treatment in addition to counting cases. It also identifies population subgroups in terms of risk patterns. The SEER Program is viewed as a research resource. It is a contract-based program, primarily with universities, most of which have statutory authority to report cancer in a defined geographic area. SEER now covers 13 areas -- nine "historic sites," two added in 1992, and two supplemental areas, together representing 14 percent of the U.S. population. SEER disproportionately covers special populations, to have enough numbers for decent estimates. It is beginning to report by population subgroups.

The data collected include race and ethnicity, date and place of birth, sociodemographic factors, aspects of the cancer, and treatment modality. There is some geocoding and information on county and census track. All cases are followed to give survival data. The registries register all *in situ* and malignant neoplasms except certain histologies for cancer of the

skin. Registries are required to abstract information for all resident patients in their area, wherever they are being treated, so this involves reciprocal agreements with adjoining states. The registry is population-based, with distinctions made between cancer occurring to residents and to nonresidents being treated in the area.

Contractors are required to report 95 percent of the cases within 18 months. The challenge, Dr. Edwards said, is maintaining confidentiality. All state-level cancer registries have to report and merge data on only one case, so that the information from all reports is aggregated. States submit tapes to SEER twice a year. NCI's SEER data are cumulative from 1973 forward, totaling two million cases, with the annual number now at 150,000. The Program works with the Census Bureau to get denominators for rate calculation. The SEER Program has a strong focus on quality control, using computer edits and other measures. Dr. Edwards said the biggest aspect of quality control is the Program's field activities, with quality control studies conducted on an ongoing basis. The first public report of data quality control in field studies will soon be published in *Cancer*. The Program also offers workshops and training courses to promote quality control.

Dr. Edwards described some of the special studies conducted, e.g., cancer trends over time, identification of long-term survivors, and case control studies. There is new interest in multiple primaries. In the last five years, there also have been linkage studies with HCFA to look at the cost of cancer and at medical practices, and with the Mormon database to look at the genetic basis of cancer.

All of this work produces a variety of resources, such as training programs and self-instructional guides. The interest in comparability and longitudinal study of data has led to work on collapsing the information and making it comparable over time. Multiple-stage schemes for cancer patients have been developed with the American College of Surgeons.

A new umbrella group is the North American Association of Central Cancer Registries (NAACCR), a vehicle for coming together to talk about common interests and goals and to promote use of the data. Dr.

Edwards said the SEER Program's use of the data includes publishing a yearly compendium of cancer data, the last iteration of which analyzes data through 1993. It has a standard format for reporting on 24 major cancer sites. 1993 data and several books are available on the Web site. In April, the SEER Program released its first extensive analysis of data by race and ethnicity (also on the Web site). She enumerated several other resources, noting the Program's desire to make the information available to as many people as possible.

The SEER Program is working with NAACCR to establish standard data forms and exchange formats to facilitate the collection and use of information. It is also developing an interactive system called CANQUES by which people can design their own tables.

Dr. Miller then described the CDC National Program of Cancer Registries (NPCR), which is in its second year of operation. It is largely focused on the 42 non-SEER states and the District of Columbia. He noted that cancer accounts for one of every four deaths in the U.S., and he stressed that cancer control involves not just treatment but prevention, community outreach, screening and early detection, and education of the public, patients and providers. The foundation of cancer control is cancer registration.

The first cancer registry tracked patients with sarcoma of the bone in the early 1920s. The first central cancer registries were in Connecticut in the 1940s. Many states have found it difficult to apply SEER data to their cancer control programs, for various reasons. Many states have had registries, but the completeness, quality and timeliness of the data have varied. As of 1990, 10 states had no central registry and forty had inadequate resources for ensuring minimum quality standards.

In 1992, the Cancer Registries Act, the result of a grass roots campaign, authorized CDC to provide grants to states to increase their capacity and enhance their existing registries or establish them. The legislation provides a model for state-specific legislation in the form of eight regulations, "the legs and regs," that offer legal support for central cancer registries. He enumerated some of the requirements,

such as standard formats and protection of confidentiality. Congress also authorized CDC to set national standards for completeness, timeliness and quality, and to monitor compliance. The national standards are designed to improve comparability among state data. CDC has endorsed the consensus standards for quality of NAACCR.

The Center requires states to prepare an annual report within 12 months of the close of the diagnosis year. The conditions reported and data items are generally the same as for SEER, except that CDC does not require active follow-up in order to calculate survival. Unlike SEER, CDC requires collection of data on industry and occupational history.

The NPCR's annual budget is \$15 million. Of the 42 states supported, eight are establishing registries and 34 are enhancing operations. Only South Dakota, Tennessee, Delaware and the Territories are not yet federally funded through NPCR or SEER. When fully operational, NPCR will collect cancer data on 93 percent of the U.S. population. Regional analysis and state comparisons will be possible, including such things as cancer cluster investigations. Both NPCR and SEER do some geocoding. (It was later noted that some areas are still not covered by either cancer registry program, including areas where cancer clusters have been identified such as the Mississippi Delta.)

NPCR is encouraging its programs to move to computerization, particularly more autonomous and user-friendly PC systems. Another priority is to modernize and implement central cancer registry computer systems. The program is also implementing comprehensive quality assurance activities. It has developed a standardized format and editing routine, and is encouraging states to use it in place of the "home-grown" editing packages states have used in the past. In some locales, EDITS is used by hospital registrars to edit their data at the time of entry.

Dr. Miller stressed that this data system's value is a function of its use to make a difference in people's lives. Thus the commitment to both enhancing the cancer registry and bridging the gap between data collection and use. He and Dr. Edwards then entertained questions.

Asked to elaborate on cancer cluster investigations, Dr. Edwards said SEER does not go out and investigate clusters, but sometimes funds investigators in the field to do so or uses the grant mechanism to stimulate research. Dr. Miller said CDC gets involved when called upon by state health departments for assistance. Mr. Van Amburg explained that most states have protocols for investigating clusters, which are generally identified by citizens. The community is typically involved in the analysis. The problem is that clusters are common and it is hard to determine which ones are "real." Many states have case sharing agreements with neighboring states.

Ms. Jones observed that money is spent disproportionately on the areas in the SEER Program. These areas can serve as centers of excellence if they and/or NPCR programs are seen as models. Noting that this kind of synergy is an NCVHS goal, she asked if this is happening. Dr. Edwards said that there has been quite a bit of linkage between the AIDS registry and cancer registries. Dr. Miller added that the national immunization and injuries programs at CDC have looked at the NPCR model legislation and structure to see what they could learn. He added that CDC has followed and commented on NCVHS's core data project and other standardization efforts, and it is trying to communicate effectively with the Department as a whole on such matters.

Dr. Carter-Pokras noted the concern about the different ways in which Hispanics are identified for cancer registries. Dr. Edwards said a conference was held in January 1996 to address this problem, and SEER is now trying to move its constituents toward a similar approach and will continue to work on this. However, the fact that the numerators and denominators have fundamental differences will continue to be a problem. Mr. Van Amburg remarked that the problem is that the data must be in the medical records to get into the cancer registries, and they are not there. It was noted that the VA has a policy of not allowing collection of this information.

Given this problem and similar ones concerning Native Americans and African Americans, which have been reported in the literature, Dr. Williams asked

how much confidence the speakers had in their data on cancer among minorities, and also whether the SEER report on race and ethnicity data discusses these data limitations and problems. Dr. Edwards replied that the report does not discuss them. She added that she does have confidence in the program's data, tempered by a sense of reality about the problems. Some examples of data issues in respect to minorities and other special populations were offered.

Asked about unique identifiers, Dr. Edwards said the social security number is collected in SEER but converted by the state to a study ID and sequence number which are all that is reported at the national level. She added that an issue is whether hospitals can share data, given that most patients visit more than one facility. The program is struggling with how to aggregate and share information. Mr. Van Amburg noted that most states have data sharing agreements, although some (e.g., Minnesota) do not.

Ms. Jones reiterated her central concern regarding the extent to which the various registries in the country are converging around core elements and whether the Department is trying to encourage this kind of standardization. Dr. Miller noted that NAACCR is helping standardize the cancer registry world, and the opportunity to comment on the National Committee's proposed data elements was another step toward convergence.

Mr. Van Amburg pointed out that CDC's basic role through the NPCR is to help coordinate individual state cancer registry systems. In some states, it plays quite a small role, albeit a very helpful one. He asked why CDC, SEER and NAACCR had different reporting deadlines, and why they are considered so important. Dr. Miller said Congress is very interested in rapid turnaround. The goal is to make the data available as rapidly as possible. It also helps states with problem solving, and is encouraging abstraction onto computer as a way of expediting the report. Dr. Edwards said that SEER's time line has been slipping because of the growing complexity of the process. She acknowledged that tight deadlines and multiple recording requirements are a problem for those producing the information. Mr. Van Amburg explained that the major issue is not supplying the data

for research, but producing a printed report that has been through the state's approval process. He suggested separating these two deadlines and having the latter be less onerous.

Net Site of Interest for this Edition: http://atlas.es.mq.edu.au/users/pingram/s_earth.html...Check out (hotlink to) “The Virtual Earth: A Tour of the World Wide Web for Earth Scientists” and “The Soft Earth: A Tour of the Web for Geoscientists”.

Final Thought(s)

Did you know...A minor earthquake with a preliminary estimated magnitude of 3.5 occurred in Clarke County, Mississippi, at 8:15 local time (9:15 EST) on March 25, according to the U.S. Geological Survey. The earthquake occurred about 15 miles south of the city of Meridian, in Lauderdale County, and was widely felt in the town of Quitman and throughout Clarke County. Earthquakes are rare but not unknown in Mississippi.

Is there a chance we might ever have a national conference on GIS and public health? You bet! As you read this newsletter, plans are underway for a “GIS in Public Health” conference to be held in May, 1998. Bill Henriques, ATSDR, will take the lead in putting it together. Look for additional information in future editions of the newsletter as this effort develops.

Charles M. Croner, Ph.D., Editor, ***PUBLIC HEALTH GIS NEWS AND INFORMATION***, Office of Research and Methodology, National Center for Health Statistics <cmc2@nch09a.em.cdc.gov>

Happy and safe holidays ... and stay in GIS touch

ATTACHMENT

Acronym	Full Journal Name	Acronym	Full Journal Name
AAPG	AAPG Explorer	JGR_Atmosphere	JGR - Atmosphere
Acta_Vul	Acta Vulcanologica	JGR_Oceans	JGR - Oceans
Adv_Space	Advances in Space Research	JGR_Planets	JGR - Planets
Adv_Water	Advances in Water Resources	JGR_Solid_Earth	JGR - Solid Earth
Am_Petrol	Am. Petrol. Geochem. Explor. Micr. Newsl.	J_African_Earth	Journal of African Earth Sciences
Am_Mineralogy	American Mineralogist	J_App_Geophy	Journal of Applied Geophysics
Am_Scientist	American Scientist	J_Arid_Envir	Journal of Arid Environments
Ann_Rev_EPS	Ann. Rev. Earth and Planetary Sciences	J_Contaminant	Journal of Contaminant Hydrology
Ann_Geophy	Annales Geophysicae	J_Geochem_Expl	Journal of Geochemical Exploration
Ant_Science	Antarctic Science	J_Geodesy	Journal of Geodesy
App_Clay	Applied Clay Science	J_Geodynamics	Journal of Geodynamics
App_Geochem	Applied Geochemistry	J_Hydrology	Journal of Hydrology
Aquat_Geochem	Aquatic Geochemistry	J_Marine_Syst	Journal of Marine Systems
Biogeochem	Biogeochemistry	J_Metamorphic	Journal of Metamorphic Geology
Bull_Geodesique	Bulletin Geodesique	J_Paleolimno	Journal of Paleolimnology
Bull_CPG	Bulletin of Canadian Petroleum Geology	J_Petrology	Journal of Petrology
Bull_GVN	Bulletin of the Global Volcanism Network	J_Sed_Res	Journal of Sedimentary Research
Bull_Volcan	Bulletin of Volcanology	J_Seismic_Expl	Journal of Seismic Exploration

Acronym	Full Journal Name	Acronym	Full Journal Name
Cal_Geogr	California Geographic Info. Ass. Newsl.	J_Seismology	Journal of Seismology
Can_Mineral	Canadian Mineralogist	J_South_Am	Journal of South American Earth Sciences
Catena	Catena	J_S_Asian	Journal of Southeaster Asian Earth Sciences
Chem_Geology	Chemical Geology	J_Stru_Geol	Journal of Structural Geology
Chinese_Astro	Chinese Astronomy and Astrophysics	J_Volcanology	Journal of Volcanology and Geothermal Res.
Cladistics	Cladistics	Lithaia	Lithaia
Climat_Dynamics	Climate Dynamics	Lithos	Lithos
Climat_Change	Climatic Change	Mar_Petro_Geol	Marine and Petroleum Geology
Coastal_Briefs	Coastal Briefs Network	Mar_Chemistry	Marine Chemistry
Coastal_Eng	Coastal Engineering	Mar_Geology	Marine Geology
Cold_Region	Cold Regions Science and Technology	Mar_Geophy_Res	Marine Geophysical Researches
Comp_Seism	Compt. Seismol. Geodyn.	Mar_Micropal	Marine Micropaleontology
Comp_Geosci	Computers and Geosciences	Mar_Pollution	Marine Pollution
Cont_Shelf	Continental Shelf Research	Mineral_Eng	Mineral Engineering
Contr_Mineral	Contributions to Mineral. and Petrol.	Mineralius	Mineralium Deposita
Coral_Reefs	Coral Reefs	NCDC_Repts	National Climatic Data Center Tech. Repts
Cret_Res	Cretaceous Research	NSF_Bull	National Science Foundation Bulletin
Deep_Sea_Res	Deep Sea Research Part II	Natural_Hazards	Natural Hazards
Drill_Comp	Drilling & Completion Fluids Magazine	NCDC_Climate	NCDC Climate Variations Bulletin
Dyn_Atm	Dynamics of Atmospheres and Oceans	New_S_Polar	New South Polar Times

Acronym	Full Journal Name	Acronym	Full Journal Name
EPSL	Earth and Planetary Science Letters	Ocean_Literat	Oceanographic Literature Review
Earth_Obs	Earth Observation Magazine	Oceanology	Oceanology
Earth_Sci_Rev	Earth Science Reviews	Ore_Geol_Rev	Ore Geology Reviews
Electr_Geology	Electronic Geology	Organic_Geochem	Organic Geochemistry
Eng_Geology	Engineering Geology	Paleo-3	Palaeogeogr. Palaeoclimat. Palaeocol.
Envir_Geology	Environmental Geology	Palaeontology	Palaeontology
Envir_Pollution	Environmental Pollution	Palaeont_News1	Palaeontology Newsletter
Envir_Res	Environmental Research	Palaaios	Palaaios
EOS_suppl	EOS, AGU Electronic Supplement	Paleobiology	Paleobiology
Estuar_Coast	Estuarine, Coastal and shelf Science	PaleoBios	PaleoBios ocalional
Europ_Soil	European Journal of Soil Science	Paleoceanogr	Paleoceanography
Expl_Mining	Exploration and Mining Geology	Palynology	Palynology
First_Break	First Break	Phys_Chem_Miner	Physics and Chemistry of Minerals
Fossils_Strata	Fossils and Strata	Phys_Chem_Earth	Physics and Chemistry of the Earth
Freiberger	Freiberger Forsch.-Palaont.Stratigr.Fazies	Phys_Earth	Physics of the Earth and Planetary Interiors
Geochimica_et	Geochimica et Cosmochimica Acta	Planet_Space	Planetary and Space Science
Geoderma	Geoderma	Polar_Glaciol	Polar and Glaciological Abstracts
GeoJournal	GeoJournal	Poalr_Record	Polar Record
Geol_Terra_N	GeoLogic, Terra NOVA	Precambrian_Res	Precambrian Research
Geol_Magazine	Geological Magazine	Proc_ODP_Init	Proceedings of the ODP, Init. Repts

Acronym	Full Journal Name	Acronym	Full Journal Name
GSA_Bull	Geological Society of America Bulletin	Proc_ODP_Sci	Proceedings of the ODP, Sci. Results
GSA_Memoir	Geological Society of America Memoir	Progr_Oceanogr	Progress in Oceanography
GSA_Spe-Paper	Geological Society of America Special Paper	Quater_Intl	Quaternary International
GS_Canada_Bull	Geological Survey of Canada Bulletins	Quater_Res	Quaternary Research
GS_Canada_Mem	Geological Survey of Canada Memoirs	Quater_Sci_Rev	Quaternary Science Reviews
GS-Canada_Misc	Geological Survey of Canada Misc. Reports	Remote_Sensing	Remote Sensing of Environment
GS_Canada_Paper	Geological Survey of Canada Papers	Rev_Palaeobot	Review of Palaeobotany and Palynology
Geol-Rundschau	Geologische Rundschau	Rev_Geophys	Reviews of Geophysics
Geology	Geology	Science	Science
Geol_Mining	Geology and Mining	Sci_American	Scientific American
Geology-Today	Geology Today	Sed_Geology	Sedimentary Geology
Geomagn_Aeron	Geomagn. Aeron.	SEPM_Spe	SEPM Special Publications
Geomorphology	Geomorphology	Soc_Vert_News	Society of Vert. Paleont. News Bulletin
Geophy_Int	Geophysical International	Southeast_Geol	Southeastern Geology
Geophy_Prospect	Geophysical Prospecting	SPE_J	SPE Journals
Geophy_Res_Let	Geophysical Research Letter	Surv_Geophs	Surveys in Geophysics
Geophysics	Geophysiics	Swiss_Bull_Min	Swiss Bull. Mineralogy and Petrology
Geosci_Eng	Geoscientists & Engineers	Tectonics	Tectonics
Geotectonics	Geotectonics	Tectonophys	Tectonophysics

Acronym	Full Journal Name	Acronym	Full Journal Name
Geothermics	Geothermics	Terra_Nova	Terra Nova
Geotimes	Geotimes	Earth_Obs	The Earth Observer from the EOS Project
Glacial_Geol	Glacial Geology and Geomorphology	Geochem	The Geochemical News
Global_Planet	Global and Planetary Change	Leading_Edg	The Leading Edge
Global_Biogeo	Global Biogeochemical Cycles	Log_Analyst	The Log Analyst
GSA_Today	GSA Today	Mining_J	The Mining Journal
Hydro_Atlas	Hydrographic Atlas of the Southern Ocean	Northern_M	The Northern Miner
icarus	Icarus	ODP_Prel	The Ocean Drilling Program, Prel. Repts
ICES	ICES Journal of Marine Science	ODP_Prosp	The Ocean Drilling Program, Sci. Prospectus
Info_Bull	Information Bulletin, Notes & News	ODP_Notes	The Ocean Drilling Program, Tech. Notes
Int_Profiles	Int. Profiles on Marine Scientific Research	Scientist	The Scientist
Int_J_Coal	International Journal of Coal Geology	Transp_Porous	Transport in Porous Media
Int_J_Mineral	International Journal of Mineral Processing	USGS_Bull	U.S. Geological Survey Bulletin
Irrigation	Irrigation and Drainage Systems	USGS_Openfile	U.S. Geological Survey Open-file Report
ISPRS	ISPRS J. Photogr. and Remote Sensing	USGS_Prof_Paper	U.S. Geological Survey Professional Paper
Izv_Phys	Izv. Phys. Solid Earth	NN_Climate	United Nations Climate Change Bulletin
Izv_Atmos	Izv., Atmos. Ocean Phys.	Waste_Manag	Waste Management & Research
J_Glacial_Geol	J. Glacial Geology and Geomorphology	Water_Resource	Water Resource Research
J_Petro_Sci	J. Petroleum Science and Engineering	Water_Res_Manag	Water Resources Management